Certificate of Test

March 2008

Quanta Computer Inc.

Product Type	**: Server**
Model Number	**: QR2-2700, QSSC-680**
Brand Name	**: Quanta**
Test Report Number	**: 0712109F-01**
Date of Test	**: February 21, 2008—February 25, 2008**

This Product was tested to the following standards at the laboratory of Global EMC Standard Tech. Corp., and found Compliance.

Standards:

FCC CFR 47, Part 15 Subpart B / CISPR 22 3rd Edition: 1997, Class A

ANSI C63.4: 2003

Canadian ICES-003

http : //www.gestek.com.tw

Sharon Chang, President

Date: March 18, 2008

GesTek EMC Lab

N0. 3, Pau-Tou-Tsuo Valley, Chia-Pau Tsuen,
Lin Kou Hsiang, Taipei County, Taiwan, R.O.C.
TEL:886-2-2603-5321
FAX:886-2-2603-5325

NVLAP LAB CODE 200085-0

Test Report Application for Verification
On Behalf Of

Quanta Computer Inc.

EUT: Server

Model Number: QR2-2700, QSSC-680

Prepared for:
Quanta Computer Inc.
No.188, Wen Hwa 2nd Rd., Kuei Shan Hsiang, Tao Yuan, Taiwan, R.O.C.

Report By : **Global EMC Standard Tech. Corp.**
No.3 Pau-Tou-Tsuo Valley, Chia-Pau Tsuen, Lin Kou Hsiang, Taipei County, Taiwan, R.O.C.
Tel : 886-2-2603-5321
Fax : 886-2-2603-5325

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1. CERTIFICATION

Applicant : Quanta Computer Inc.

EUT Description	: Server
Model Number	: QR2-2700, QSSC-680
Brand Name	: Quanta
Serial Number	: N/A
Tested Power Supply	: 120Vac/60Hz

MEASUREMENT PROCEDURES USED:

☑ **CFR 47, Part 15**	Radio Frequency Device Subpart B Unintentional Radiators Class A
☑ **CISPR 22 3rd Edition:1997**	Limits and methods of measurement of radio disturbance Characteristics of information technology equipment: 1997
☑ **ANSI C63.4**	Methods of Measurements of Radio-Noise Emissions from Low- Voltage Electrical and Electronic Equipment in the range of 9kHz To 40GHz:2003
☑ **Canadian ICES-003**	Implementation and Interpretation off the Interference-Causing Equipment Standard for Digital Apparatus, ICES-003

THE MEASUREMENT SHOWN IN THE ATTACHMENT WAS MADE IN ACCORDANCE WITH THE PROCEDURES INDICATED, AND THE MAXIMUM ENERGY EMITTED BY THE EQUIPMENT WAS FOUND TO BE WITHIN THE ABOVE LIMITS APPLICABLE.

NVLAP®

NVLAP LAB CODE 200085-0

Date of Test: February 21, 2008—February 25, 2008

In order to ensure the quality and accuracy of this document, the contents have been thoroughly reviewed by the following qualified personnel from GesTek Lab.

Documented By :

Rini Chen

Rini Chen / adm. Dept. Supervisor

Tested By :

Sky Chuang

Sky Chuang / eng. Dept. Engineer

Approved By :

Tonny Lin

Tonny Lin / General Manager

This test data shown below is traceable to National or international standard such as NIST/USA, etc. The laboratory's NVLAP accreditation in no way constitutes or implies product certification, approval, or endorsement by NVLAP or the United States government.

2. SUMMARY OF TEST RESULTS

The Worst Emission data was found as following

STANDARD	TEST ITEM	TEST RESULT	REMARKS
(1)FCC Part 15 (2)CISPR 22 3rd Edition:1997 (3)Canadian ICES-003. Class A	Conducted emission (Mode 7)	PASS	The worst emission frequency is 2.0222 MHz. And minimum passing margin is –18.72 dB. The measurement uncertainty is 3.6 dB.
	Radiated emission (Mode 7)	PASS	The worst emission frequency is 666.6803 MHz at Vertical. And minimum passing margin is –4.37 dB. Height of antenna is 3.0 M. Angle of turntable is 75°. The measurement uncertainty is 5.1 dB.

3. GENERAL INFORMATION

3.1 PRODUCTION DESCRIPTION

Product Name	:	Server
Model Number	:	QR2-2700, QSSC-680
Brand Name	:	Quanta
Serial Number	:	N/A
Applicant	:	Quanta Computer Inc.
Address	:	No.188, Wen Hwa 2nd Rd., Kuei Shan Hsiang, Tao Yuan, Taiwan, R.O.C.
Manufacturer	:	1. Tech-Front (Shanghai) Computer Co., Ltd. 2. Quanta Manufacturing Nashville LCC 3. Tech-Com (Shanghai) Computer Co., Ltd.
Address	:	1. No. 2, Lane 58, Sanzhuang Road, Songjiang Export Processing Zone, Shanghai 201613, P. R. China 2. 1621 Heil Quaker Blvd., LaVergne TN 37086, USA 3. No. 68, Sanzhuang Road, Songjiang Export Processing Zone, Shanghai, 201613, P.R. China
Power Supply	:	AC Input:100-127V~11.0A, 200-240V~5.5A, DC Output:750W
Power Cord	:	3pins, 1.8m, Non-Shielded, Non-Core

3.2 TEST MODES & EUT COMPONENTS DESCRIPTION

Test Mode	Mode 1-Pre Scan Mode	Mode 2-Pre Scan Mode
CPU	Intel Harpertown 2.8G*2	
Memory	Qimonda 2G*8	
HDD	Hitachi 750G*8	Seagate 146G*8
Gigabit LAN*2	On Board (10/100/1000 Mbps)	
LAN*1	On Board (10/100 Mbps)	
Mother Board	Quanta, M/N: QME-2200, QSSC-680MB, P/N: 10-L SAS 21S87MB0000	
S.P.S.	Delta, M/N: DPS-750EB B, BSMI ID: R33030	
Resolution	1280 x 1024, V-Sync: 75Hz	
Test Mode	**Mode 3-Pre Scan Mode**	**Mode 4-Pre Scan Mode**
CPU	Intel Harpertown 2.8G*2	
Memory	Qimonda 2G*8	
HDD	Seagate 750G*8	Hitachi 750G*8
Gigabit LAN*2	On Board (10/100/1000 Mbps)	
LAN*1	On Board (10/100 Mbps)	
Mother Board	Quanta, M/N: QME-2200, QSSC-680MB, P/N: 10-L SAS 21S87MB0000	Quanta, M/N: QME-2200, QSSC-680MB, P/N: 8-L SAS 21S87MB0080 PCI SLOT
S.P.S.	Delta, M/N: DPS-750EB B, BSMI ID: R33030	
Resolution	1280 x 1024, V-Sync: 75Hz	
Test Mode	**Mode 5-Pre Scan Mode**	**Mode 6-Pre Scan Mode**
CPU	Intel Harpertown 2.8G*2	
Memory	Qimonda 2G*8	
HDD	Hitachi 750G*8	Hitachi 750G*6
Gigabit LAN*2	On Board (10/100/1000 Mbps)	
LAN*1	On Board (10/100 Mbps)	
Mother Board	Quanta, M/N: QME-2200, QSSC-680MB, P/N: 8-L SAS 21S87MB0060 NO PCI SLOT	Quanta, M/N: QME-2200, QSSC-680MB, P/N: 10-L SATA 21S87MB0020 NO PCI SLOT
S.P.S.	Delta, M/N: DPS-750EB B, BSMI ID: R33030	
Resolution	1280 x 1024, V-Sync: 75Hz	

Test Mode	Mode 7-Test Mode	Mode 8-Pre Scan Mode
CPU	Intel Harpertown 2.8G*2	
Memory	Qimonda 2G*8	
HDD	Hitachi 750G*6	
Gigabit LAN*2	On Board (10/100/1000 Mbps)	
LAN*1	On Board (10/100 Mbps)	
Mother Board	Quanta, M/N: QME-2200, QSSC-680MB, P/N: 8-L SATA 21S87MB0090 PCI SLOT	Quanta, M/N: QME-2200, QSSC-680MB, P/N: 8-L SATA 21S87MB0070 NO PCI SLOT
S.P.S.	Delta, M/N: DPS-750EB B, BSMI ID: R33030	
Resolution	1280 x 1024, V-Sync: 75Hz	
Test Mode	**Mode 9- Pre Scan Mode**	**Mode 10-Pre Scan Mode**
CPU	Intel Harpertown 2.8G*2	
Memory	Apacer 1G*8	Kingston 2G*4 Samsung 1G*4
HDD	Hitachi 750G*6	
Gigabit LAN*2	On Board (10/100/1000 Mbps)	
LAN*1	On Board (10/100 Mbps)	
Mother Board	Quanta, M/N: QME-2200, QSSC-680MB, P/N: 8-L SATA 21S87MB0090 PCI SLOT	Quanta, M/N: QME-2200, QSSC-680MB, P/N: 8-L SATA 21S87MB0090 PCI SLOT
S.P.S.	Delta, M/N: DPS-750EB B, BSMI ID: R33030	
Resolution	1280 x 1024, V-Sync: 75Hz	
Test Mode	**Mode 11- Pre Scan Mode**	**Mode 12-Pre Scan Mode**
CPU	Woodcrest 3.0GHz*2	Intel Harpertown 2.8G*2
Memory	Qimonda 2G*8	
HDD	Hitachi 750G*6	
Gigabit LAN*2	On Board (10/100/1000 Mbps)	
LAN*1	On Board (10/100 Mbps)	
Mother Board	Quanta, M/N: QME-2200, QSSC-680MB, P/N: 8-L SATA 21S87MB0090 PCI SLOT	Quanta, M/N: QME-2200, QSSC-680MB, P/N: 8-L SATA 21S87MB0090 PCI SLOT
S.P.S.	Delta, M/N: DPS-750EB B, BSMI ID: R33030	
Resolution	1280 x 1024, V-Sync: 75Hz	1024 x 768, V-Sync: 75Hz

Test Mode	Mode 13- Pre Scan Mode
CPU	Intel Harpertown 2.8G*2
Memory	Qimonda 2G*8
HDD	Hitachi 750G*6
Gigabit LAN*2	On Board (10/100/1000 Mbps)
LAN*1	On Board (10/100 Mbps)
Mother Board	Quanta, M/N: QME-2200, QSSC-680MB, P/N: 8-L SATA 21S87MB0090 PCI SLOT
S.P.S.	Delta, M/N: DPS-750EB B, BSMI ID: R33030
Resolution	800 x 600, V-Sync: 75Hz

Note:

1.According to pre-scan data, we determine the data (Mode 7) shown in this test report, which reflects the worst-case data for each operation mode.

2.The EUT has two model numbers, because of the requirement of marketing.

Keypart list			
Item	**Vendor**	**Model Number**	**Part Number**
Mother Board	Quanta	21S87MB0000	10-L SAS
		21S87MB0020	10-L SATA
		21S87MB0080	8-L SAS PCI(e) SLOT
		21S87MB0060	8-L SAS NO PCI(e) SLOT
		21S87MB0090	8-L SATA PCI(e) SLOT
		21S87MB0070	8-L SATA NO PCI(e) SLOT
Riser Board	Quanta	22S87RB0000	
HDD BP	Quanta	22S58HB0020	
CD-R BP	Quanta	3AS29CB0009	
Front Panel	Quanta	27S58PB0008	
CPU	Intel	Harpertown 2.8G FSB:1600MHz 12MB Dual771 Stepping C0 Wott 80W	
		Woocrest, 3.0GHz FSB:1333MHz 4MB Stepping G0 Wott65W	
Memory	Apacer	1GB/667 FB-DIMM AP1024QTFE667	
	Kingston	2GB/FB-DIMM DGM431NABINTD1F	
	Samsung	1GB/FB-DIMM M395T2953CZ4	
	Qimonda	2GB/FB-DIMM HYS72T256420HFN-3S-B	
HDD	Hitachi	SATA HDD 750G HUA721075KLA330	
	Seagate	SATA HDD 750G ST3750640NS	
		SAS HDD 146G ST3146855SS	
S.P.S.*2	Delta	DPS-750EB B, AC Input::100-127V~11.0A, 200-240V~5.5A, DC Output:750W	
CD-R/RW/ DVD-ROM	SONY NEC OPTIARC INC	CRX880A	
ADD ON CARD	adaptec	ICP5085BL	SAS CARD

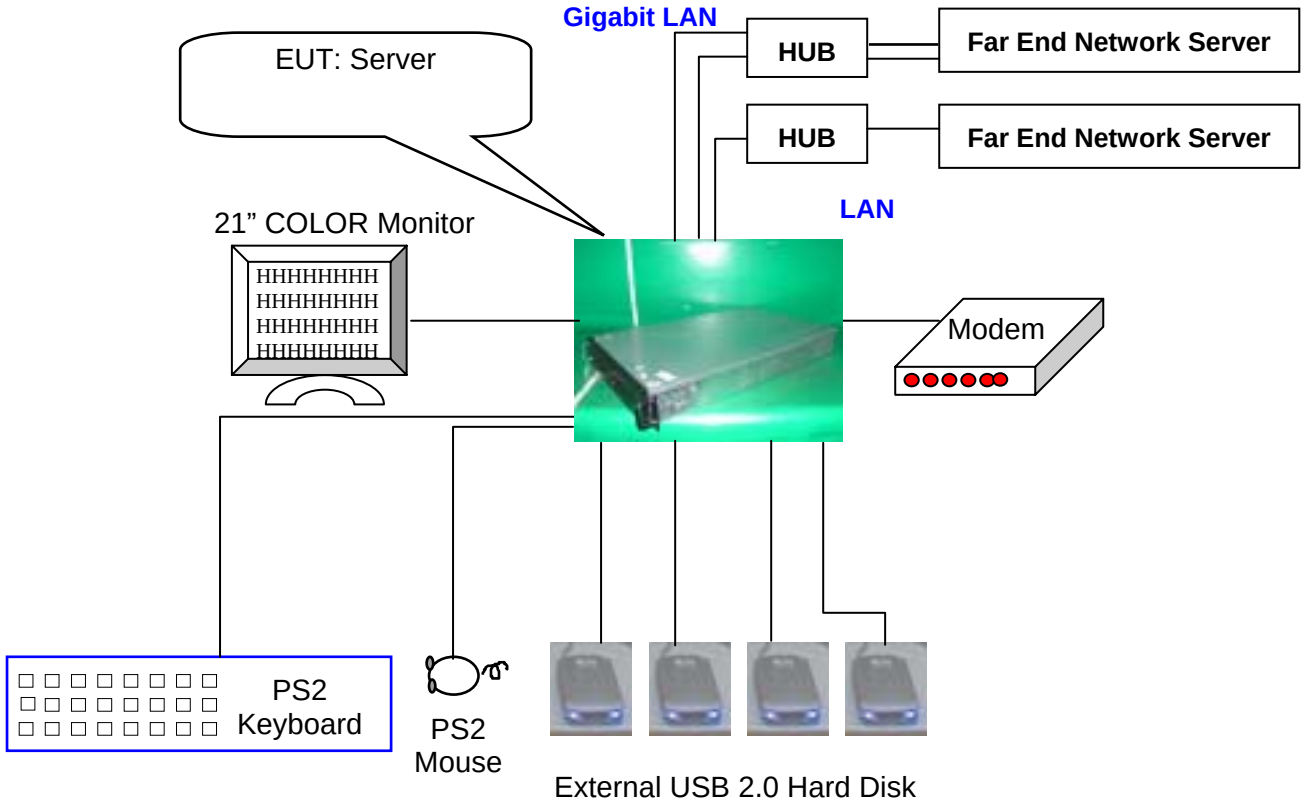
3.3 CONFIGURATION OF THE TESTED SYSTEM

The FCC IDs/Types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards, which have grants) are:

Device	No.	Configuration
21" COLOR Monitor	**M01-060**	Manufacturer : COMPAQ Model Number : PE1143-41 Serial Number : N/A BSMI ID : R31708 FCC ID : N/A Data Cable : Shielded, detachable, 1.5m, VGA Cable Power Cord : 3Pin, Shielded, Detachable, 1.5m
Modem	**M03-018**	Manufacturer : ACEEX Model Number : 1414V Serial Number : 0046171 BSMI ID : N/A FCC ID : IFAXDM1414 Data Cable : T Type:RS232, Shielded, Detachable, 1.2m Power Cord : Non-Shielded, Detachable, 1.5m Line : Type:RJ11(4P2C), Detachable, 1.8m Phone : Type:RJ11(4P2C), Detachable, 1.8m
PS2 Keyboard	**K01-099**	Manufacturer : acer Model Number : T200-P BSMI ID : R41097 FCC ID : N/A Data Cable : Shielded, Undetachable, 1.8 m
PS2 Mouse	**M02-400**	Manufacturer : detrois Model Number : CanMouse CM-309 Serial Number : N/A BSMI ID : R63159 FCC ID : N/A Data Cable : Shielded, Undetachable, 1.5m
External USB 2.0 Hard Disk	**U02-079**	Manufacturer : TERASYS Model Number : F12-UF Serial Number : A0100215-34P0030 BSMI ID : 4912A002 Data Cable : Shielded, detachable, 1.5m AC Power Adaptor : YHI, M/N:YS-1015-U12A, BSMI ID:4872A185 Input: AC IN:100V 50/60Hz 35VA Output: DC +12V ,1.25A
External USB 2.0 Hard Disk	**U02-078**	Manufacturer : TERASYS Model Number : F12-UF Serial Number : A0100215-34P0030 BSMI ID : 4912A002 Data Cable : Shielded, detachable, 1.5m AC Power Adaptor : YHI, M/N:YS-1015-U12A, BSMI ID:4872A185 Input: AC IN: 100V 50/60Hz 35VA Output: DC +12V ,1.25A

Device	No.	Configuration
External USB 2.0 Hard Disk	**U02-100**	Manufacturer : TERASYS Model Number : F12-UF BSMI ID : 4912A002 Data Cable : Shielded, detachable, 1.5m AC Power Adaptor : YHI, M/N:YS-1015-U12A, BSMI ID:4872A185 Input: AC IN: 100V 50/60Hz 35VA Output: DC +12V,1.25A
External USB 2.0 Hard Disk	**U02-066**	Manufacturer : TERASYS Model Number : F12-UF Serial Number : A0100215-34P0030 BSMI ID : 4912A002 Data Cable : Shielded, detachable, 1.5m AC Power Adaptor : YHI, M/N:YS-1015-U12A, BSMI ID:4872A185 Input: AC IN: 100V 50/60Hz 35VA Output: DC +12V ,1.25A
Far End Network Server (For Gigabit LAN)	**-----**	Manufacturer : ASUS Model Number : AP160R Power Cord : Non- Shielded, Detachable, 1.8m
HUB (For Gigabit LAN)	**-----**	Manufacturer : D-Link Model Number : DGS-1005D Power Cord : Non- Shielded, Detachable, 2.0m, 2pin
Far End Network Server (For LAN)	**-----**	Mother Board : ASUS, M/N: TUSL2-C F.D.D. : Panasonic, M/N: JU-257A606P H.D.D. : Seagate, M/N: ST330621A CD-ROM : MITSUMI, M/N: CRMC-FX4830T VGA : On Board Sound : On Board LAN : On Board SDRAM : 32MB PC100 CPU : Intel,733M/133MHz S. P. S. : DELTA, M/N: DTPS-200PB-109C Power Cord : Non-Shielded, Detachable, 1.8m
HUB (For LAN)	**-----**	Manufacturer : D-Link Model Number : DES-1008D (10/100BASE-T Ethernet Hub) Data Cable to EUT : Type:RJ45(UTP/8P8C), Detachable, 12 m, Twisted Pairs Power Cord : Non-Shielded, Detachable, 1.5m

3.4 BLOCK DIAGRAM OF CONNECTIONS BETWEEN EUT AND SIMULATORS



3.5 TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4-2003.
Radiated testing was performed at an antenna to EUT distance of **10** meters.
(For frequencies below 1000MHz)

Radiated testing was performed at an antenna to EUT distance of **3** meters.
(For frequencies above 1000MHz)

3.6 TEST FACILITY

Ambient conditions in the laboratory:

ITEMS	Requirement
TEMPERATURE (°C)	10-40
HUMIDITY (%RH)	10-90
BAROMETRIC PRESSURE (mbar)	860-1060
FCC SITE DESCRIPTION	Aug. 10, 1995 /Aug. 25, 1998 File on FCC Engineering Laboratory Federal Communication Commission 7435 Oakland Mills Road Columbia, MD 21046 Reference 31040/SIT1300F2
NVLAP LAB. CODE	200085-0 United Stated Department of commerce National Institute of Standards and Technology National Voluntary Laboratory Accreditation Program Accreditation on NVLAP effective through Sep. 30, 2008 For CISPR 22, FCC Method and AS/NZS CISPR 22 Measurement.
Taiwan Accreditation Foundation (TAF)	Recognized by the Council of Taiwan Accreditation Foundation and confirmed to meet the requirements of ISO/IEC 17025. Registration No.: 1082 Registration on TAF effective through Sep. 19, 2009

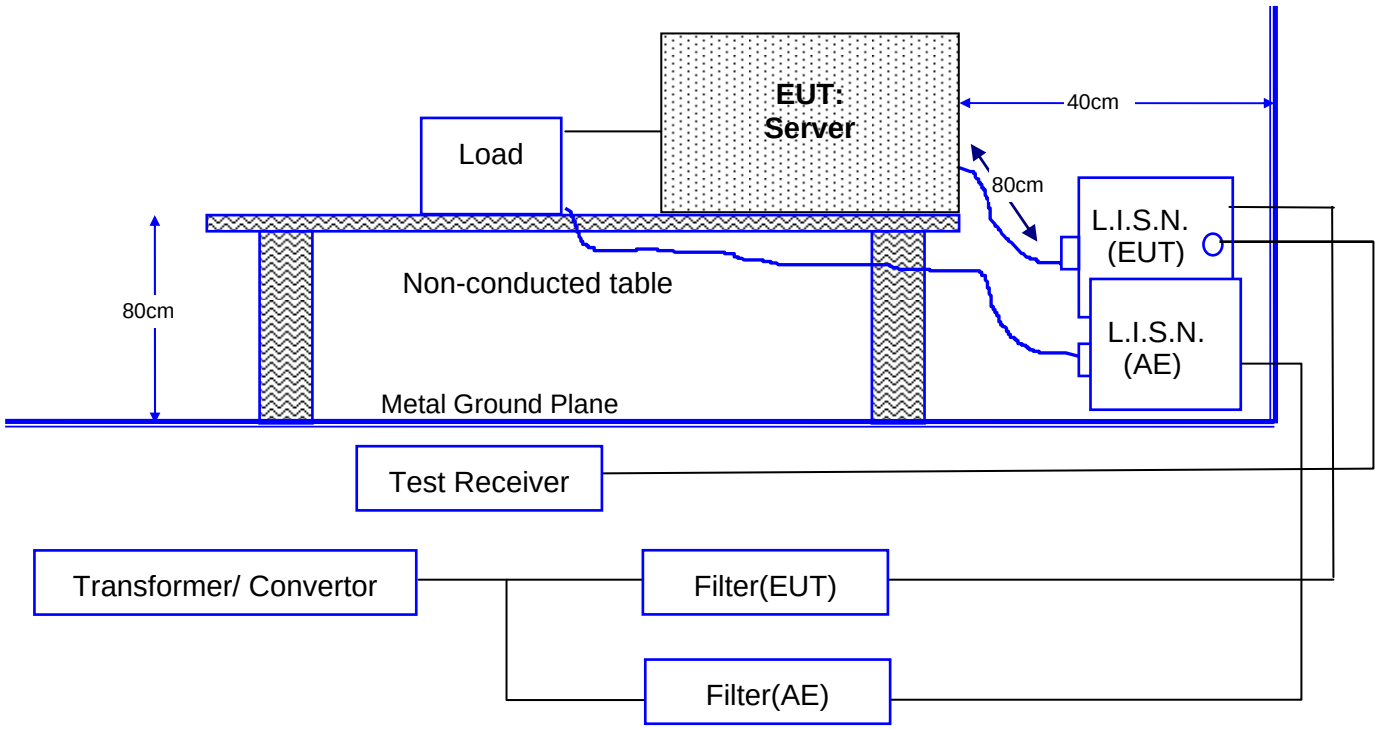
4. CONDUCTED EMISSION MEASUREMENT

4.1 TEST EQUIPMENTS

The following test equipment are used during the conducted power line tests:

Item	Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
1	Test Receiver	R & S	ESCS30	825022/003	2008.05.25
2	LISN.(EUT)	R & S	ENV216	100006	2008.05.28
3	L.I.S.N.(AE)	ROLF HEINE	NNB-2/16Z	98091	2008.07.22
4	RF CABLE	GTK	N/A	GTK-E-A154-01	2008.11.26
5	50 Ohm Terminator	GTK	N/A	GTK-E-A130-01	N/A
6	Shielded Room	GTK	N/A	B5	N/A

4.2 BLOCK DIAGRAM OF TEST SETUP



Note: This is a representative setup diagram for Table-top EUT.
For Floor-standing EUT, the table will be removed with all others setup condition remain the same.

4.3 CONDUCTED EMISSION LIMIT

☐FCC Limit

Frequency	Maximum RF Line Voltage			
	Class A		Class B	
MHz	μV	dBμV	μV	dBμV
0.45 to 1.705	1000	60.0	250	48.0
1.705 to 30	3000	69.5	250	48.0

Remarks : 1. RF Line Voltage (dBμV) = 20 log RF Line Voltage (μV).
2. In the Above Table, the tighter limit applies at the band edges.

☒CISPR Limit

Frequency	Maximum RF Line Voltage dB(μV)			
	Class A		Class B	
MHz	QUASI-PEAK	AVERAGE	QUASI-PEAK	AVERAGE
0.15 to 0.50	79	66	66 to 56	56 to 46
0.50 to 5.0	73	60	56	46
5.0 to 30	73	60	60	50

Remarks : In the Above Table, the tighter limit applies at the band edges.

4.4 EUT CONFIGURATION ON MEASUREMENT

The equipments that are listed 4.1 are installed on Conducted Power Line Test to meet the Commission requirement and operating in a manner, which tends to maximize its emission characteristics in a normal application.

The device under test, installed in a representative system as described in section 4.2, was placed on a non-conductive table whose total height equal to 80cm. Powered from one L.I.S.N. which signal output to receiver, and the other peripherals was powered from another L.I.S.N. which signal output was terminated by 50Ω.

4.5 CONDUCTED EMISSION DATA

The measurement range of conducted emission, which is from **0.15 MHz to 30 MHz**, was investigated. All readings are quasi-peak and average values with a resolution Bandwidth of 9 KHz. The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range for all the test modes. Then the worst modes were reported the following data pages.

4.6 OPERATING CONDITIONS OF THE EUT

The EUT exercise program used during conducted testing was designed to exercise the EUT in a manner similar to a typical use. The exercise sequence is listed as below:

1. Setup the EUT and simulators as shown on 4.2.
2. Turn on the power of all equipments.
3. Boot the Server from Hard Disk and setup the video to windows Server 2003, active all devices.
4. Adjust to appropriate video resolution.
5. Connect the Far End Network Server and run test program “test.bat “.
6. The EUT exchange the information with the GesTek server via HUB.
7. Active other internal devices such as network function.
8. Run “DVD-Play” & “H.D.D. R/W” & “EMC” test program under windows Server 2003.
9. Server sent “H” pattern to monitor, make the “H” pattern full in the screen.
10. Server sent “H” pattern to parallel and serial port.
11. Repeat above steps.

4.7 CONDUCTED EMISSION MEASUREMENT RESULTS

Date of Test	February 25, 2008	**Temperature**	26 ℃
EUT	Server	**Humidity**	60 %
Test Mode	Mode 7 (Power 1)	**Display Pattern**	H Pattern
Test Power Supply	AC 120V/60Hz		

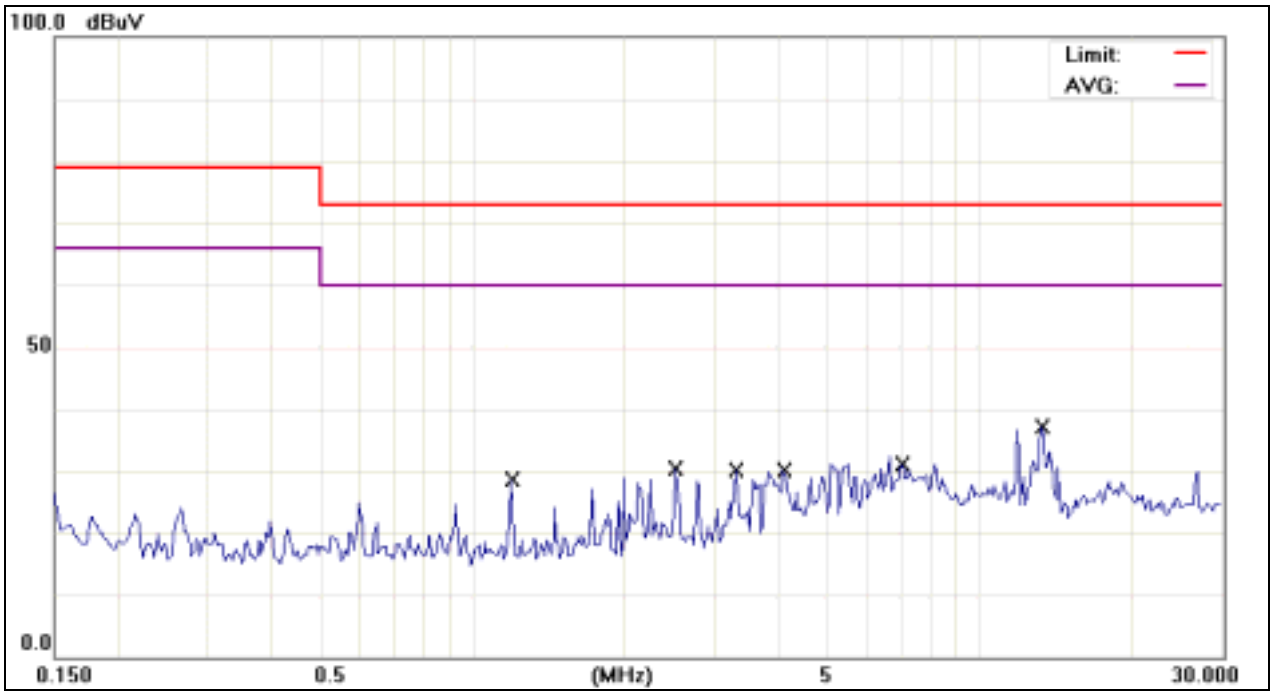
Line

No.	Frequency MHz	Reading Level dBμV	Factor dB	Measurement dBμV	Limit dBμV	Over Limit dB	Detector
1	1.1980	16.47	9.64	26.11	73.00	-46.89	QP
2	1.1980	14.09	9.64	23.73	60.00	-36.27	AVG
3	2.5220	19.05	9.65	28.70	73.00	-44.30	QP
4	2.5220	16.71	9.65	26.36	60.00	-33.64	AVG
5	3.3197	19.38	9.66	29.04	73.00	-43.96	QP
6	3.3197	17.69	9.66	27.35	60.00	-32.65	AVG
7	4.1170	19.22	9.65	28.87	73.00	-44.13	QP
8	4.1170	15.31	9.65	24.96	60.00	-35.04	AVG
9	7.0825	18.32	9.70	28.02	73.00	-44.98	QP
10	7.0825	17.40	9.70	27.10	60.00	-32.90	AVG
11	13.3117	27.34	9.82	37.16	73.00	-35.84	QP
12	★13.3117	24.83	9.82	34.65	60.00	-25.35	AVG

Remarks :

1. All readings are Quasi-peak and Average values.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = L.I.S.N. insertion loss + cable loss
5. " ★ " means that this data is the worse case measurement level.
6. The measurement uncertainty is 3.6 dB.

Line



Remark: 1. The "Limit" in right-up corner in above diagram refers to Quasi-peak ; "AVG" refers to the limit of Average.

Date of Test	February 25, 2008	**Temperature**	26 ℃
EUT	Server	**Humidity**	60 %
Test Mode	Mode 7 (Power 1)	**Display Pattern**	H Pattern
Test Power Supply	AC 120V/60Hz		

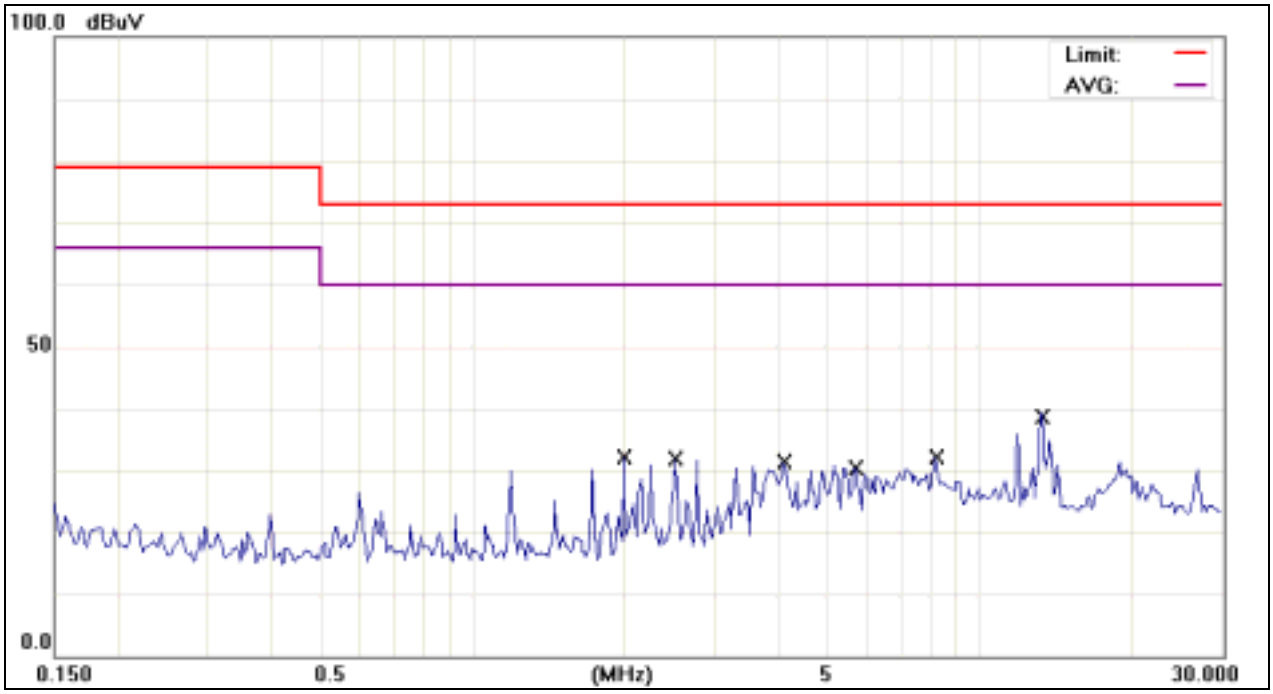
Neutral

No.	Frequency MHz	Reading Level dBµV	Factor dB	Measurement dBµV	Limit dBµV	Over Limit dB	Detector
1	1.9934	21.65	9.64	31.29	73.00	-41.71	QP
2	★1.9934	21.26	9.64	30.90	60.00	-29.10	AVG
3	2.5222	19.72	9.65	29.37	73.00	-43.63	QP
4	2.5222	18.51	9.65	28.16	60.00	-31.84	AVG
5	4.1172	19.87	9.65	29.52	73.00	-43.48	QP
6	4.1172	15.56	9.65	25.21	60.00	-34.79	AVG
7	5.7143	17.18	9.70	26.88	73.00	-46.12	QP
8	5.7143	13.24	9.70	22.94	60.00	-37.06	AVG
9	8.1924	21.26	9.79	31.05	73.00	-41.95	QP
10	8.1924	18.86	9.79	28.65	60.00	-31.35	AVG
11	13.4198	19.18	9.85	29.03	73.00	-43.97	QP
12	13.4198	14.15	9.85	24.00	60.00	-36.00	AVG

Remarks :

1. All readings are Quasi-peak and Average values.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = L.I.S.N. insertion loss + cable loss
5. " ★ " means that this data is the worse case measurement level.
6. The measurement uncertainty is 3.6 dB.

Neutral



Remark: 1. The "Limit" in right-up corner in above diagram refers to Quasi-peak ; "AVG" refers to the limit of Average.

Date of Test	February 25, 2008	**Temperature**	26 ℃
EUT	Server	**Humidity**	60 %
Test Mode	Mode 7 (Power 2)	**Display Pattern**	H Pattern
Test Power Supply	AC 120V/60Hz		

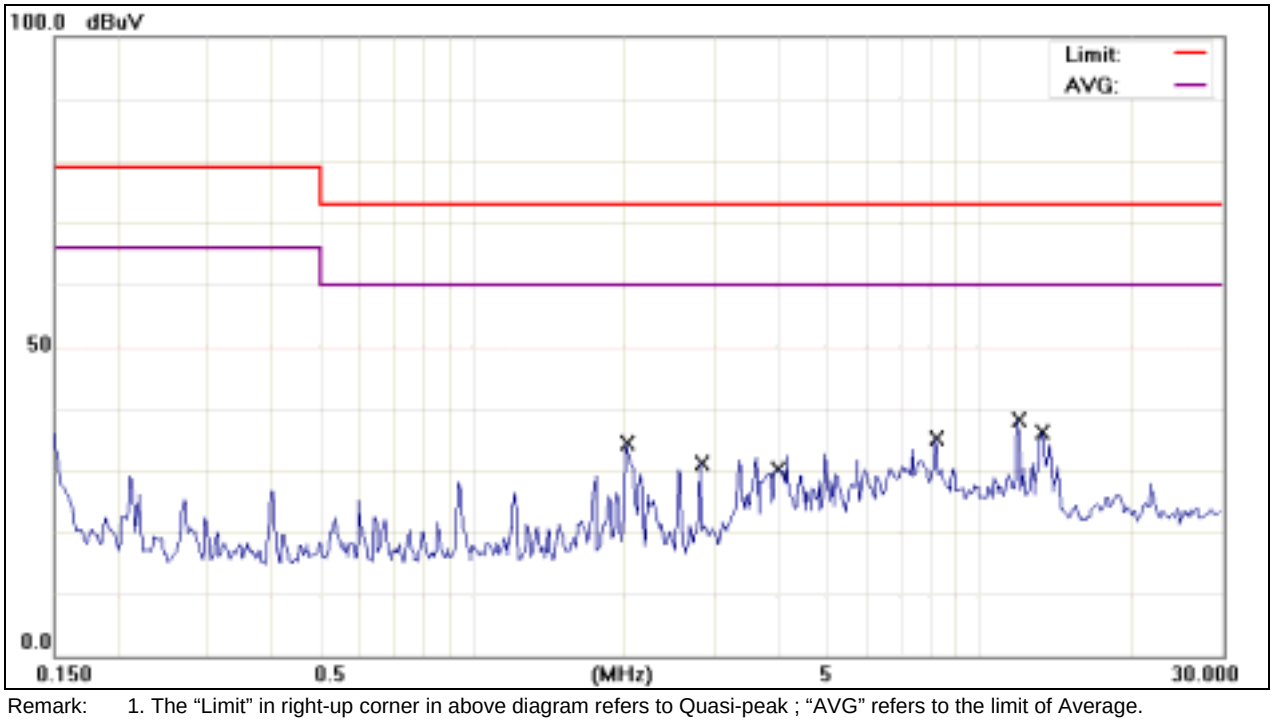
Line

No.	Frequency MHz	Reading Level dBµV	Factor dB	Measurement dBµV	Limit dBµV	Over Limit dB	Detector
1	2.0229	25.81	9.64	35.45	73.00	-37.55	QP
2	2.0229	24.65	9.64	34.29	60.00	-25.71	AVG
3	2.8319	20.55	9.66	30.21	73.00	-42.79	QP
4	2.8319	20.52	9.66	30.18	60.00	-29.82	AVG
5	4.0252	18.66	9.65	28.31	73.00	-44.69	QP
6	4.0252	17.79	9.65	27.44	60.00	-32.56	AVG
7	8.1917	24.11	9.72	33.83	73.00	-39.17	QP
8	8.1917	21.71	9.72	31.43	60.00	-28.57	AVG
9	11.9476	24.56	9.79	34.35	73.00	-38.65	QP
10	11.9476	23.78	9.79	33.57	60.00	-26.43	AVG
11	13.3111	27.54	9.82	37.36	73.00	-35.64	QP
12	★13.3111	25.29	9.82	35.11	60.00	-24.89	AVG

Remarks :

1. All readings are Quasi-peak and Average values.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = L.I.S.N. insertion loss + cable loss
5. " ★ " means that this data is the worse case measurement level.
6. The measurement uncertainty is 3.6 dB.

Line



Remark: 1. The "Limit" in right-up corner in above diagram refers to Quasi-peak ; "AVG" refers to the limit of Average.

Date of Test	February 25, 2008	**Temperature**	26 ℃
EUT	Server	**Humidity**	60 %
Test Mode	Mode 7 (Power 2)	**Display Pattern**	H Pattern
Test Power Supply	AC 120V/60Hz		

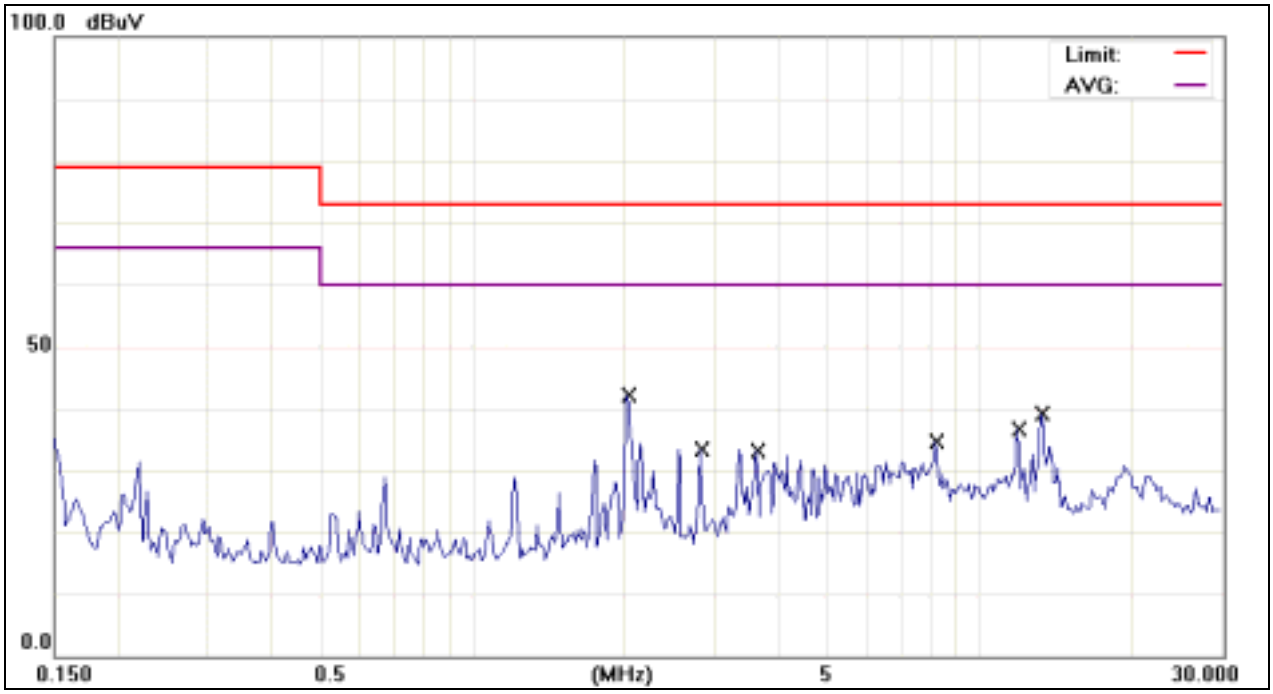
Neutral

No.	Frequency MHz	Reading Level dBμV	Factor dB	Measurement dBμV	Limit dBμV	Over Limit dB	Detector
1	2.0222	31.97	9.64	41.61	73.00	-31.39	QP
2	★2.0222	31.64	9.64	41.28	60.00	-18.72	AVG
3	2.8315	23.01	9.66	32.67	73.00	-40.33	QP
4	2.8315	22.58	9.66	32.24	60.00	-27.76	AVG
5	3.6420	22.43	9.65	32.08	73.00	-40.92	QP
6	3.6420	20.91	9.65	30.56	60.00	-29.44	AVG
7	8.1952	22.80	9.79	32.59	73.00	-40.41	QP
8	8.1952	19.58	9.79	29.37	60.00	-30.63	AVG
9	11.9486	25.37	9.85	35.22	73.00	-37.78	QP
10	11.9486	24.83	9.85	34.68	60.00	-25.32	AVG
11	13.3115	27.58	9.85	37.43	73.00	-35.57	QP
12	13.3115	25.35	9.85	35.20	60.00	-24.80	AVG

Remarks :

1. All readings are Quasi-peak and Average values.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = L.I.S.N. insertion loss + cable loss
5. " ★ " means that this data is the worse case measurement level.
6. The measurement uncertainty is 3.6 dB.

Neutral



Remark: 1. The "Limit" in right-up corner in above diagram refers to Quasi-peak ; "AVG" refers to the limit of Average.

5. RADIATED EMISSION MEASUREMENT

5.1 TEST EQUIPMENT

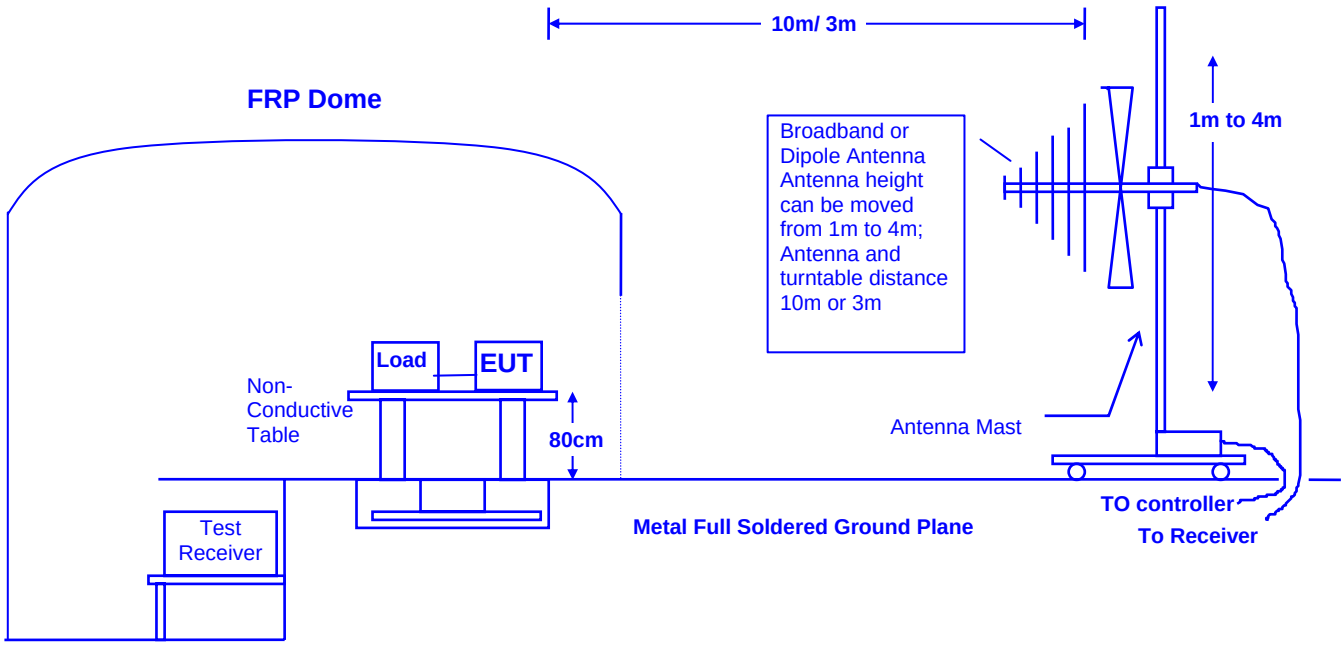
The following test equipments are used during the radiated emission tests:

Item	Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
1	Test Receiver	R & S	ESCS30	825022/003	2008.05.25
2	Spectrum Analyzer	ADVANTEST	R3172	150101278	2008.03.07
3	Pre-Amplifier	HP	8447D	2944A08607	2008.09.09
4	Pre-Amplifier	HP	8449B	3008A01264	2008.06.21
5	BILOG Antenna	SCHAFFNER	CBL6112B	2812	2008.11.22
6	HORN ANTENNA	ELECTRO-METRICS	EM-6961	103329	2008.06.20
7	CABLE	GTK	N/A	GTK-E-A317-01	2008.11.06
8	Open Site	GTK	N/A	A1	2008.05.18

5.2 OPEN TEST SITE SETUP DIAGRAM

Note: This is a representative setup diagram for Table-top EUT.

For Floor-standing EUT, the table will be removed with all others setup condition remain the same.



5.3 RADIATED EMISSION LIMIT

☐FCC Class B Limit at 3m

Frequency	Distance	Field Strength	
MHz	Meter	μV/m	dBμV/m
30 to 88	3	100	40.0
88 to 216	3	150	43.5
216 to 960	3	200	46.0
Above 960	3	500	54.0

Note: The frequencies above 1000MHz, as measured using instrumentation with a peak detector function was corresponding to 20dB above the maximum permitted average limit.
(Refer 47CFR Ch. 1 (10-1-98 Edition §15.35(b))

☒FCC Class A Limit at 10m

Frequency	Distance	Field Strength	
MHz	Meter	μV/m	dBμV/m
30 to 88	10	90	39.0
88 to 216	10	150	43.5
216 to 960	10	210	46.4
Above 960	10	300	49.5

Remark :1. The tighter limit shall apply at the edge between two frequency bands.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
3. The field-strength measurement above 1000MHz was made at a distance of 3m.

☒CISPR Class A Limit at 10m

Frequency	Distance	Field Strength
MHz	Meter	dB(μV/m)
30 to 230	10	40
230 to 1000	10	47

Remark :1. The tighter limit shall apply at the edge between two frequency bands.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

5.4 EUT CONFIGURATION

The equipment which is listed 5.1 are installed on Radiated Emission Test to meet the Commission requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

The device under test, installed in a representative system as described in section 5.2, was placed on a non-conductive table whose total height equaled 80 cm. This table can be rotated 360 degree. The measurement antenna was mounted to a non-conductive mast capable of moving the antenna vertically. Antenna height was varied from 1 meter to 4 meters and the system under test was rotated from 0 degree through 360 degrees relative to the antenna position and polarization (Horizontal and Vertical). Also the I/O cable position was investigated to find the maximum emission condition.

5.5 OPERATING CONDITION OF EUT

Same as section 4.6.

5.6 RADIATED EMISSION DATA

The measurement range of radiated emission, which is from **30 MHz to 14 GHz,** was investigated. All readings are quasi-peak values with a resolution Bandwidth of 120 KHz. The initial step in collecting radiated emission data is a spectrum analyzer peak scans of the measurement range for all the test modes and then use test receiver for final measurement. Then the worst modes were reported the following data pages.

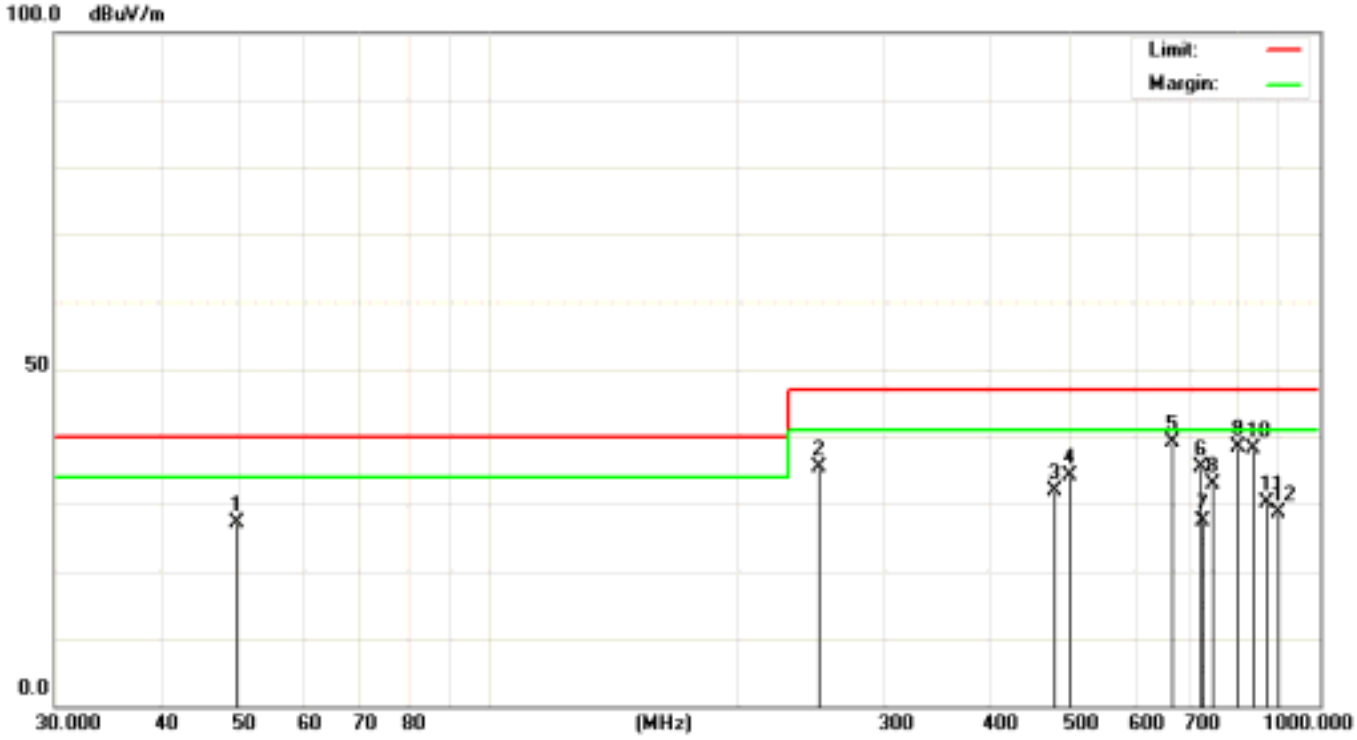
5.7 RADIATED EMISSIONS MEASUREMENT RESULTS

Date of Test	February 21, 2008	**Temperature**	25 deg/C
EUT	Server	**Humidity**	68 %RH
Working Cond.	Mode 7	**Display Pattern**	H Pattern
Antenna distance	10m at **Horizontal**	**Frequency Range**	30-1000MHz
Test Power Supply	AC 120V/60Hz		

No.	Frequency MHz	Reading Level dBµV	Factor dB	Measurement dBµV/m	Limit dBµV/m	Over Limit dB	Detector
1	49.3600	41.00	-13.77	27.23	40.00	-12.77	QP
2	249.9963	44.86	-9.60	35.26	47.00	-11.74	QP
3	480.0392	35.90	-4.14	31.76	47.00	-15.24	QP
4	499.9930	37.90	-3.71	34.19	47.00	-12.81	QP
5	★666.6810	40.20	-0.96	39.24	47.00	-7.76	QP
6	720.0562	35.67	-0.28	35.39	47.00	-11.61	QP
7	725.0070	27.56	-0.20	27.36	47.00	-19.64	QP
8	750.0145	32.66	0.18	32.84	47.00	-14.16	QP
9	800.0163	37.50	0.92	38.42	47.00	-8.58	QP
10	833.3830	36.82	1.35	38.17	47.00	-8.83	QP
11	866.5782	28.34	1.78	30.12	47.00	-16.88	QP
12	900.0195	26.34	2.20	28.54	47.00	-18.46	QP

Remarks:

1. All Readings below 1GHz are Quasi-Peak.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. " ★ " means that this data is the worse case measurement level.
6. The measurement uncertainty is 5.1 dB.



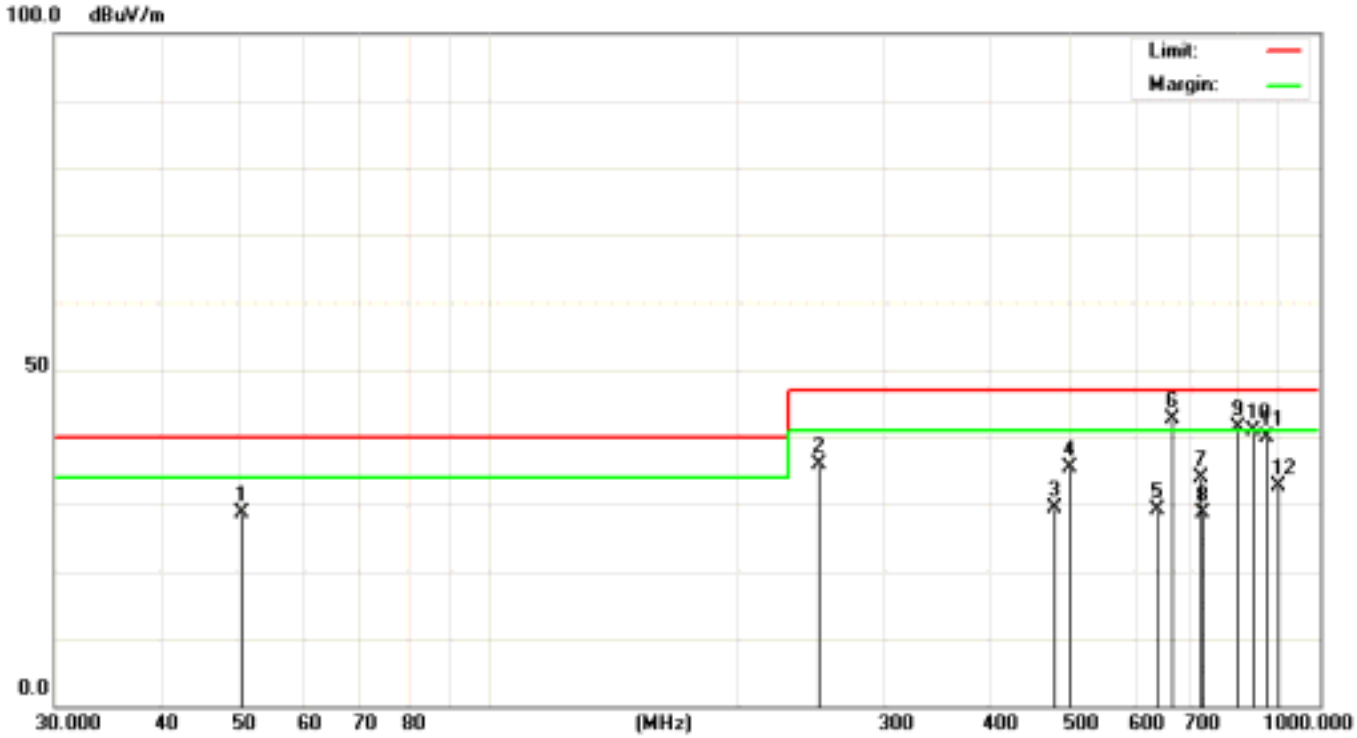
Remark: 1. The "Limit" in right-up corner in above diagram refers to Quasi-peak ; "Margin" refers to the data under 6dB.

Date of Test	February 21, 2008	**Temperature**	25 deg/C
EUT	Server	**Humidity**	68 %RH
Working Cond.	Mode 7	**Display Pattern**	H Pattern
Antenna distance	10m at **Vertical**	**Frequency Range**	30-1000MHz
Test Power Supply	AC 120V/60Hz		

No.	Frequency MHz	Reading Level dBµV	Factor dB	Measurement dBµV/m	Limit dBµV/m	Over Limit dB	Detector
1	50.0600	42.31	-13.71	28.60	40.00	-11.40	QP
2	249.9977	45.49	-9.60	35.89	47.00	-11.11	QP
3	480.1542	33.57	-4.13	29.44	47.00	-17.56	QP
4	499.9927	39.21	-3.71	35.50	47.00	-11.50	QP
5	640.0142	30.41	-1.26	29.15	47.00	-17.85	QP
6	★666.6803	43.59	-0.96	42.63	47.00	-4.37	QP
7	720.0570	34.21	-0.28	33.93	47.00	-13.07	QP
8	725.4570	28.73	-0.19	28.54	47.00	-18.46	QP
9	800.0169	40.50	0.92	41.42	47.00	-5.58	QP
10	833.3835	39.62	1.35	40.97	47.00	-6.03	QP
11	866.8605	38.16	1.78	39.94	47.00	-7.06	QP
12	900.0187	30.31	2.20	32.51	47.00	-14.49	QP

Remarks:

1. All Readings below 1GHz are Quasi-Peak.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. " ★ " means that this data is the worse case measurement level.
6. The measurement uncertainty is 5.1 dB.



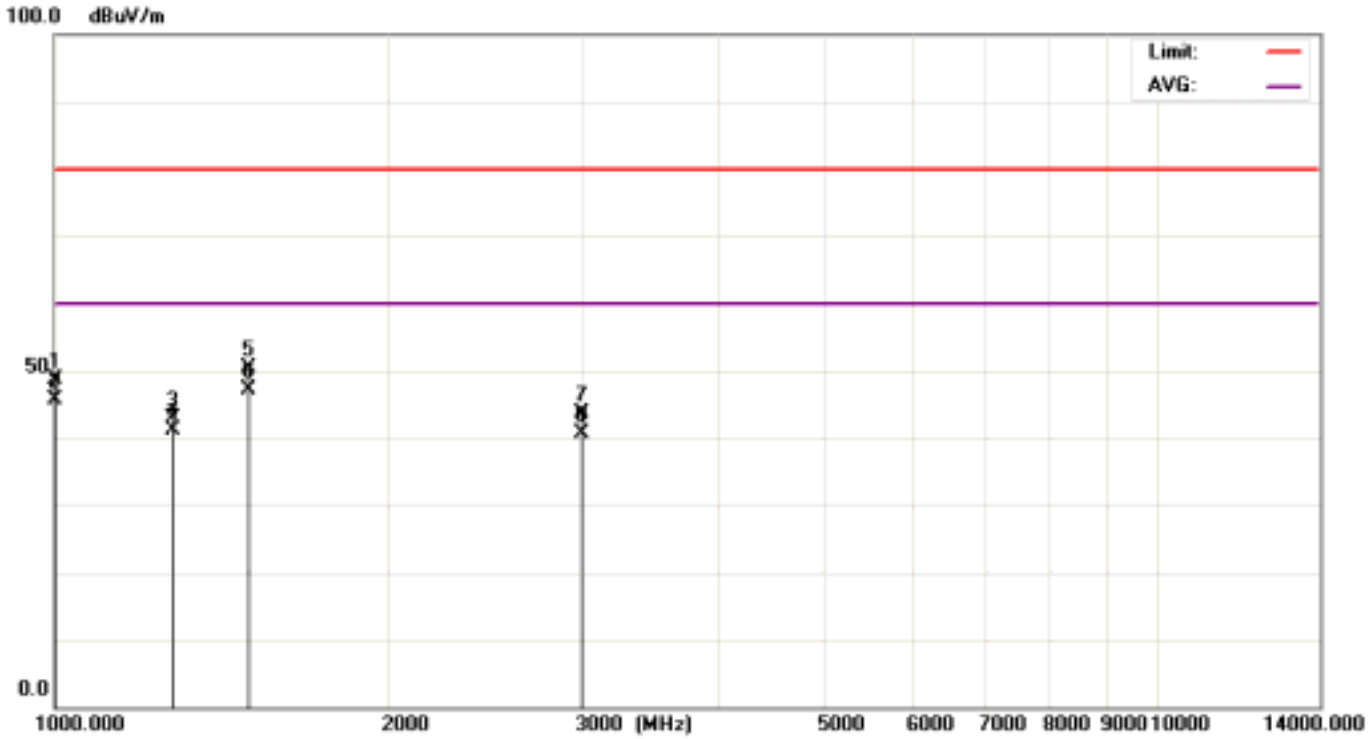
Remark: 1. The "Limit" in right-up corner in above diagram refers to Quasi-peak ; "Margin" refers to the data under 6dB.

Date of Test	February 25, 2008	**Temperature**	25 deg/C
EUT	Server	**Humidity**	68 %RH
Working Cond.	Mode 7	**Display Pattern**	H Pattern
Antenna distance	3m at **Horizontal**	**Frequency Range**	1GHz~14GHz
Test Power Supply	AC 120V/60Hz		

No.	Frequency MHz	Reading Level dBµV	Factor dB	Measurement dBµV/m	Limit dBµV/m	Over Limit dB	Detector
1	1000.0000	56.74	-8.00	48.74	80.00	-31.26	peak
2	1000.0000	53.66	-8.00	45.66	60.00	-14.34	AVG
3	1280.0100	48.78	-5.81	42.97	80.00	-37.03	peak
4	1280.0100	46.96	-5.81	41.15	60.00	-18.85	AVG
5	1500.0100	54.55	-4.10	50.45	80.00	-29.55	peak
6	1500.0100	51.13	-4.10	47.03	60.00	-12.97	AVG
7	3000.0340	40.72	2.90	43.62	80.00	-36.38	peak
8	3000.0340	37.77	2.90	40.67	60.00	-19.33	AVG

Remarks:

1. All Readings are Peak and Average value.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. The measurement uncertainty is 3.7 dB.



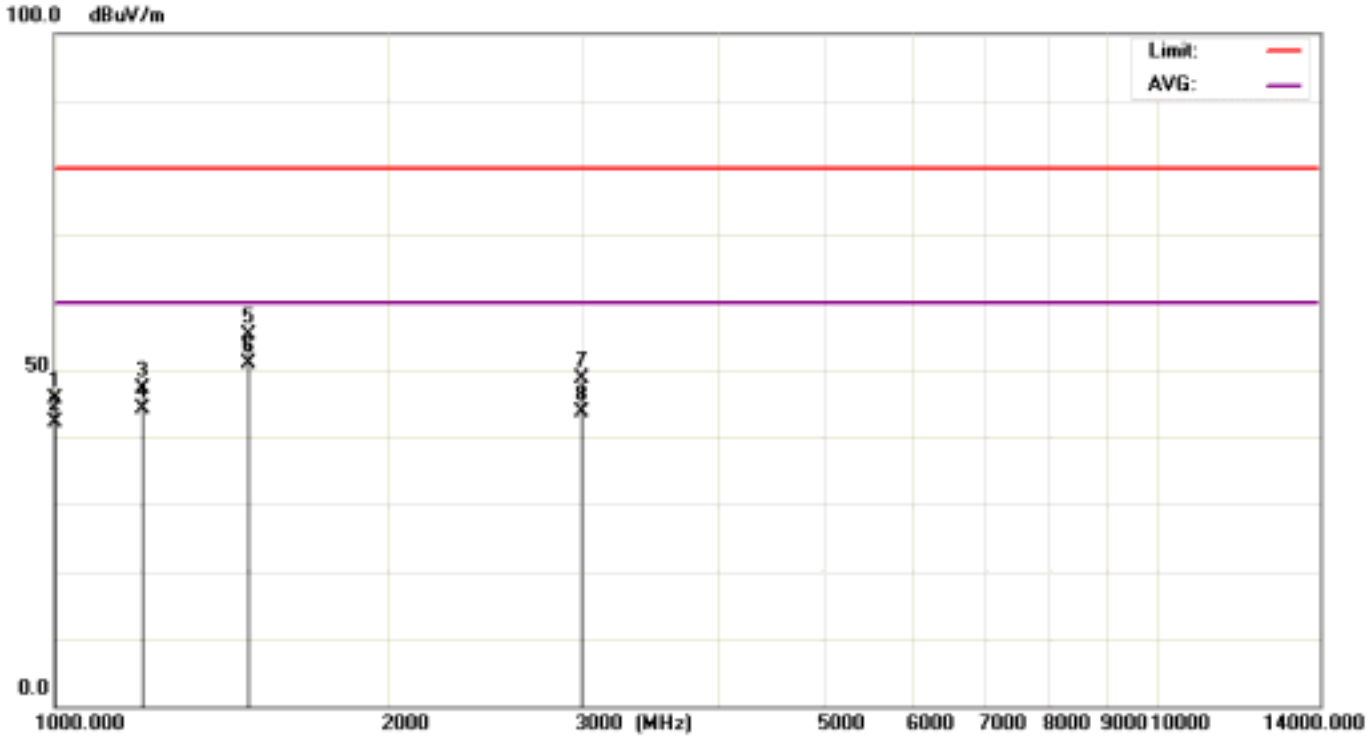
Remark: 1. The “Limit” in right-up corner in above diagram refers to peak ; “AVG” refers to the limit of Average.

Date of Test	February 25, 2008	**Temperature**	25 deg/C
EUT	Server	**Humidity**	68 %RH
Working Cond.	Mode 7	**Display Pattern**	H Pattern
Antenna distance	3m at **Vertical**	**Frequency Range**	1GHz~14GHz
Test Power Supply	AC 120V/60Hz		

No.	Frequency MHz	Reading Level dBµV	Factor dB	Measurement dBµV/m	Limit dBµV/m	Over Limit dB	Detector
1	1000.0000	53.70	-8.00	45.70	80.00	-34.30	peak
2	1000.0000	50.23	-8.00	42.23	60.00	-17.77	AVG
3	1201.8500	53.59	-6.43	47.16	80.00	-32.84	peak
4	1201.8500	50.64	-6.43	44.21	60.00	-15.79	AVG
5	1500.0700	59.11	-4.10	55.01	80.00	-24.99	peak
6	1500.0700	54.99	-4.10	50.89	60.00	-9.11	AVG
7	3000.1100	45.75	2.90	48.65	80.00	-31.35	peak
8	3000.1100	40.67	2.90	43.57	60.00	-16.43	AVG

Remarks:

1. All Readings are Peak and Average value.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. The measurement uncertainty is 3.7 dB.



Remark: 1. The “Limit” in right-up corner in above diagram refers to peak ; “AVG” refers to the limit of Average.

6. PHOTOGRAPHS FOR TEST

6.1 TEST PHOTOGRAPHS FOR CONDUCTION

Mode 7

6.2 TEST PHOTOGRAPHS FOR RADIATED

Mode 7

7. PHOTOGRAPHS FOR PRODUCT

1. Front View Of Server (EUT)
2. Back View Of Server (EUT)

3.IO Port
4.IO Port

5. Inner View of Server (EUT)

8. EMI/EMS REDUCTION METHOD DURING COMPLIANCE TESTING

No.	Component Name	Manufacturer	Standards	Quantity	Position
1	Gasket	CTN	156*31*3 mm	1	I/O GASKET
2	Gasket	TCT	104*3*1 mm	2	Riser bracket
3	Gasket	TCT	104*7*1 mm	2	Riser bracket
4	EMI FINGER	CTN	74*7*1.05 mm	8	HDD TRAY

Appendix A

Circuit (Block) Diagram

(Shall be added by Applicant)

Appendix B

User Manual

(Shall be added by Applicant)